

ATOMIC ENERGY *newsletter*[®]

A SERVICE FOR INDUSTRY BUSINESS ENGINEERING AND RESEARCH
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Dear Sir:

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The U. S. is reserving the right to resume testing of nuclear weapons, President Eisenhower said in a statement issued last week. The U. S., Britain and Russia up to now had invoked unilateral moratoriums on testing such weapons. The President's statement suggested that the U. S.'s present state of negotiations with the Soviet Union on a permanent ban precluded further unilateral action. (The Geneva atomic weapons talks, which began October 1958, have recently seen rejection by Soviet conferees of the reservations of U. S. physicists and others on the ability to detect underground nuclear detonations.) Meanwhile, nuclear weapons tests will not be resumed by the U. S., the President stated, unless advance notice is publicly given.

Two metric tons of uranium oxide have been sold by Western Nuclear, Inc., Denver, Colo., to the Japan Atomic Fuels Corp., an agency of the Japanese government. Western Nuclear's price won out over bids from uranium producers in Canada and South Africa, according to G. T. Sakai of the New York office of C. Itoh & Co., a trading firm representing Japan Atomic Fuels. Western Nuclear operates mines in the Gas Hills area of Wyoming and a mill at Jeffrey City, Wyoming. (Other RAW MATERIALS NEWS, p. 5 this LETTER.)

Program to provide special training in nuclear energy during the Summer has been extended into 1960 with recent signing of contract between American Society for Engineering Education and the USAEC. These eight week programs were offered to faculty members in 1959, and have been for the previous four Summers. USAEC contracts with the appropriate institutions to teach the courses, and makes the grants to the attendee's institution. The ASEE administers the programs, determines the types of institutes, selects attendees, and evaluates the programs. Those attending receive from their institutions an extra month's salary and the USAEC makes a grant to the university of the amount up to \$750 plus transportation.

First Canadian Conference on Uranium and Atomic Energy is scheduled for Jan. 11, 12, 13 at the King Edward-Sheraton Hotel, Toronto. Sponsored by the Province of Ontario, it is to be non-technical in nature. Full details may be obtained from Dep't. of Energy Resources, Queen's Park, Toronto.

Uranium material for the reactor core of H.M.S. Dreadnought will be manufactured and supplied by Mallinckrodt Nuclear Corp., St. Louis, Mo., under order placed by Westinghouse Electric Corp., suppliers of the complete nuclear propulsion plant for the British vessel. Westinghouse's Atomic Fuel Department will fabricate the fuel into the completed Dreadnought reactor core. Mallinckrodt, who will convert the uranium at its Hematite, Mo., plant, were the first U. S. company to begin commercial processing of enriched uranium hexafluoride to uranium materials suitable for use as nuclear fuels. (Other PRODUCT NEWS, p. 3 this LETTER.)

ATOMIC ENERGY CONTRACT NEWS...

BIDS INVITED: Proposals have been invited by the USAEC from public and private utility companies to construct two prototype nuclear power stations, each with minimum capacity of 50,000 net electrical kw. One plant would incorporate a boiling water reactor. For this plant, bids are asked for providing the conventional portion and for operating the entire utility. In addition, other bids are asked for designing, developing and constructing the reactor itself. Detailed information on these projects is now available from the USAEC's Chicago operations office.

The other plant would incorporate an organic-cooled and moderated reactor. Utilities submitting proposals would design, construct and operate the entire plant. For this job, detailed information may be obtained after January 15, 1960 from the USAEC's Idaho operations office, Idaho Falls, Idaho.

PROPOSALS MADE: An unsolicited proposal has been made jointly to the USAEC by Consumers Power Co., Jackson, Mich., and General Electric Co.'s atomic power equipment department, San Jose, Calif., to build a 50,000 electrical kw nuclear power plant at Big Rock Point, between Charlevoix and Petoskey, Mich., on Lake Michigan. A boiling water reactor would be used. The proposal stated that its design would result in a substantial increase in power per unit volume of fuel over present levels of boiling water reactors. Fuel elements used would have "long life and low fabrication costs". The proposal asks the USAEC to support research and development to an undisclosed amount, and also asks waiver by the USAEC of fuel use charges up to agreed amount. GE and Consumers Power would do research and development under separate contracts with the Commission. Consumers Power would pay all costs of plant construction and operation; estimated capital cost of the project, including site and site preparation, is put at over \$27 million.

Five proposals have been made to the USAEC to operate a small nuclear power plant which the Commission is designing and will construct. Submitting proposals prior to the deadline of Dec. 21, 1959 were City of Miamisburg, Ohio; City of Detroit, Mich.; City of Fort Pierce, Fla.; City of Jamestown, N.Y.; and Dairyland Power Cooperative, La Crosse, Wisc. The proposed plant would use a pressurized water reactor with a fossil fueled superheater to generate about 60,000 kw of heat from the reactor and approximately 22,000 kw of electrical power from the plant. (Gibbs & Hill, Inc., New York, are working on the design of the steam-producing portion of the plant. Proposals from manufacturers for the reactor are due Feb. 1, 1960.)

Proposal of The Fluor Corp., Ltd., Los Angeles, Calif., to do architect-engineering work on the USAEC's organic cooled reactor has been accepted by the Commission, and a contract is being negotiated with the firm by the USAEC on the basis of its proposal. Atomics International, Canoga Park, Calif., will work on a subcontract basis with Fluor and assist in the design of the nuclear portion of the plant. Phillips Petroleum Co. had done conceptual design of the facility which will be built at the USAEC's National Reactor Testing Station, Arco., Idaho. The Commission has \$6 million which Congress made available to it for this reactor which will be a flexible facility to be used for experiments aimed at developing economic reactors cooled and moderated by organic fluids (hydro-carbons).

CONTRACTS AWARDED: Award of a \$1,174,500 subcontract to Pittsburgh-Des Moines Steel Co., Pittsburgh, for the containment shell and air locks of the experimental gas-cooled reactor at Oak Ridge has been made by H. K. Ferguson Co., prime construction contractor on this job for the USAEC. This shell, to be 216-ft. high and 114-ft. in diameter, will serve as the reactor building to house the reactor, steam generators, servicing and charge machines, circulating blowers, and auxiliary equipment. In the event of a nuclear accident, it will contain the release of fission products. (The Commission is building this reactor, at a cost of about \$30 million, as a facility for testing gas-cooled reactor materials, fuels, and coolants while at the same time producing about 22,000 net electrical kw.)

Under recent contract received by Babcock & Wilcox Co., N.Y., from Battelle Memorial Institute's nuclear research center, Columbus, Ohio, B&W will supply the third core for Battelle's research reactor. This replacement core, consisting of 27 plate-type fuel elements and six control elements, will be fabricated at B&W's nuclear facilities plant, Lynchburg, Va. Fissionable material in each fuel element will consist of highly enriched uranium, alloyed with aluminum in curved plate form.

NEW PRODUCTS, PROCESSES, INSTRUMENTS...

NEW PRODUCTS FROM MANUFACTURERS: Scalar ratemeter Model 555 is a radioisotope counting assembly combining in a single instrument a scaler, ratemeter, integral-analyzer, high voltage supply, and audible clicker-howler. Operating with any Geiger or scintillation detector, Model 555 provides in one compact package all basic elements needed for medical isotope work.--Baird-Atomics, Inc., 33 University Rd., Cambridge 38, Mass.

Count rate meter, Model 502, has eight scale ranges extending to 600,000 cpm; an all-transistor circuit is used. Time constants of 1, 5 and 10 seconds are selected by front panel switching. Input is said to be sensitive to a 250 mv negative pulse.--Interstate Electronics Corp., 707 E. Vermont Ave., Anaheim, Calif.

Dicalcium phosphate wafers, trade-named Spanitol, for human use orally, are flavored chewable wafers each of which supply 3 grams of dicalcium phosphate free of strontium-90. They are made by a process for which a patent is now pending. They are offered as a practical means of reducing by about half the amount of strontium-90 absorbed by the body from the diet. Linus Pauling originally called attention to this method. It is based on the observation that there is a 'discrimination factor' between calcium and strontium in the human intestine which tends to limit the proportion of ingested strontium absorbed. (G. E. Harrison, W. H. A. Raymond, H. C. Tretheway; Clin. Sci. 14,681,1955.) Therefore, if the diet is supplemented with calcium to the extent suggested by Dr. Pauling, the strontium-90 ingested will be absorbed only to the extent of about 1/2 of what it would have been without this supplementation. Since it is of course essential that this supplementary calcium salt be strontium-90 free, special manufacturing procedures are used to produce the Spanitol brand dicalcium phosphate wafers.--Certified Products Co., Ardsley, N.Y.

Scintillation detector, Model SC-57A, is a new well-type instrument said to have an extremely low background. The instrument employs a 1/2-in. diameter gamma well crystal that accepts standard 5 ml sample vials. Suggested fields of use are in applications requiring the assay of isotopes in liquid solution.--Tracerlab, Inc., Waltham, Mass.

PRODUCT NEWS: Process to extract technetium has been developed by the U. K. Atomic Energy Authority. At the Authority's Windscale Works, some 20 grams of the pure element have been made by processing over 100 tons of wastes. It is initially separated from the waste with an ion exchange resin, then removed from the resin with strong nitric acid, and concentrated by evaporation. Further purification and concentration is with methyl ethyl ketone; the solvent is removed by evaporation. (The Authority also has 100 grams of protactinium, believed to be the bulk of the world's supply. It has been isolated from nearly 60 tons of waste materials from uranium production. Now however, changes in the uranium production process will cut this source off.)

Second fuel charge for the O.E.E.C. boiling heavy water reactor project at Halden, Norway, has been ordered by the Norwegian Institutt for Atomenergi from A. B. Atomenergi of Sweden. Value of the order is approximately \$500,000. The Halden reactor, which is one of the two experimental reactors in the current program of the O.E.E.C. European Nuclear Energy Agency, has been operating at zero power since last June using a fuel charge of natural uranium metal. The second fuel charge will be about 1,500 kg of 1.5% enriched uranium oxide, made up into 100 7-element assemblies of zircalloy-clad rods. Delivery is for March, 1961.

Levels of strontium-90 activity, reported by the Public Health Service and as based on weekly samples from 51 stations on 17 major rivers of the U. S., have shown a general decrease for the fourth quarter, 1959, reaching a low for the year. This was after a gradual increase had occurred in many rivers during the first three quarters of the year. For the fourth quarter, levels averaged about 0.6 uuc/liter... The levels of radio-activity in milk collected during August and September, 1959, from 12 sampling stations across the U. S. showed decreases for strontium-90 in September at all 12 stations. Greatest drop was at the New York station which went from 12.3 uuc/liter in August to 4.2 uuc/liter in September. As compared to the levels for the month of July, 8 of the 11 stations reporting that month showed decreases in August and three were slightly higher. Those higher were Cincinnati with 10.5 for July and 12.4 for August; Overton, Nevada, 1.8 and 3.0; and St. Louis, Mo., 17.6 and 19.6.

BOOKS & OTHER PUBLICATIONS...

Annual Review of Nuclear Science. Vol. 9. E. Segre, et al., editors. Accomplishments in the physical sciences for the year 1959 particularly as regards nuclear energy. 625 pages. -- Annual Reviews, Inc., Palo Alto, Calif.

Nuclear Technology for Engineers. R. H. Ellis, Jr. A work covering four major areas of nuclear engineering: radiation, fission energy, nuclear fusion, and radio-tracer technology. 284 pages. -- McGraw-Hill Book Co., Inc., New York 36, N.Y. (\$8.50)

Radioisotopes in Industry. Survey of current uses of radioisotopes. (\$2.75)
.....Structural Design Basis for Reactor Pressure Vessels and Directly Associated Components. No. PB-151,987. (\$3.00).....Direct Nuclear Electrogenator. Work by Fairchild Engine Div., Deer Park, N.Y. on direct conversion of nuclear fission energy to high voltage electricity. No. PB-151,989 (\$2.75).....Beryllium: A Search of the Unclassified Literature. Research project of Lockheed Aircraft Corp., Palo Alto, Calif. 58 pages. 241 refs. No. PB-161,012. (\$1.50).....Optimum Nuclear Reactor-Saline Water Evaporator Process: Preliminary Design Study. 255 pages. No. PB-161,010. (\$4.00).....Molten-Salt Reactor Program: Report of Oak Ridge National Laboratory for Period Ending 31 July 1959. 109 pages. (\$2.50) -- Office of Technical Services, Wash. 25, D.C.

Proper Role of Detergents in Relation to Radiological Decontamination. Investigations at Army Chemical Center, Md. No. PB-143,500. (Microfilm, \$2.40; Photostat, \$3.30).....Radiation Damage Study. Work on dosage determinations at Radiation Laboratory, Univ. of Pittsburgh. No. PB-143,357 (Microfilm, \$1.80; Photostat, \$1.80) -- Library of Congress, Wash. 25, D.C.

Proceedings of the Second U.N. Conference on Peaceful Uses of Atomic Energy. Complete record of the Geneva Conference held in 1958. Some 2,100 papers are available in thirty-two volumes. -- United Nations (Atomic Energy), New York, N.Y. or Geneva, Switzerland.

Radiation Counters and Detectors. C. C. H. Washtell. A simplified introduction to radioactive detectors and measurement techniques. 115 pages. -- Philosophical Library, 15 E. 40th St., New York 16, N.Y. (\$7.50)

ATOMIC ENERGY PATENT DIGEST...

PATENTS ISSUED December 15, 1959 to PRIVATE ORGANIZATIONS AND/OR INDIVIDUALS:

(1) Neutronic reactor control. Roger S. Dreffin, inventor. No. 2,917,444 issued to inventor of record. (2) Isotope separator. Otto G. Schwede, inventor. No. 2,917,628 issued to inventor of record. (3) Radioactivity indicating device and method. William G. Hyzer, inventor. No. 2,917,631 assigned to The Parker Pen Co., Janesville, Wisc. (4) Radiation detector and indicator. Nicholas Anton, inventor. No. 2,917,632 issued to inventor of record. (5) Nuclear radiation counters. Jeno M. Barnothy, inventor. No. 2,917,634 assigned to Nuclear-Chicago Corp., Des Plaines, Ill. (6) Nuclear radiation counters. William C. Davidon, inventor. No. 2,917,648 assigned to Nuclear-Chicago Corp., Des Plaines, Ill.

PATENTS ISSUED December 15, 1959 to GOVERNMENTAL ORGANIZATIONS: (1) Uranous iodate as a carrier for plutonium. D. R. Miller, G. T. Seaborg, S. G. Thompson, inventors. No. 2,917,358 assigned to USAEC. (2) Separation of fission products from hexavalent plutonium by carrier precipitation. T. H. Davies, inventor. No. 2,917,359 assigned to USAEC. (3) Method of producing uranium tetrafluoride. W. B. Tolley, R. C. Smith, inventors. No. 2,917,360 assigned to USAEC. (4) Method of recovering transuranic elements of an atomic number below 95. G. T. Seaborg, R. A. James, inventors. No. 2,917,361 assigned to USAEC. (5) Method of oxidizing plutonium ion with bismuthate ion. C. S. Garner, inventor. No. 2,917,362 assigned to USAEC. (6) Separation of plutonium from uranium. H. M. Feder, R. L. Nuttall, inventors. No. 2,917,382 assigned to USAEC. (7) Fabrication of uranium-aluminum alloys. H. A. Saller, inventor. No. 2,917,383 assigned to USAEC. (8) Method of increasing the dispersibility of slurry particles. J. P. McBride, inventor. No. 2,917,406 assigned to USAEC. (9) Nuclear reactor. John J. Grebe, inventor. No. 2,917,443 assigned to USAEC. (10) Neutronic reactor control rod drive apparatus. L. C. Oakes, C. S. Walker, inventors. No. 2,917,445 assigned to USAEC. (11) Radiation detecting and telemetering system. H. K. Richards, inventor. No. 2,917,633 assigned to USAEC. (12) Geiger-Muller type counter tube. I. L. Fowler, L. A. K. Watt, inventors. No. 2,917,647 assigned to USAEC.

ATOMIC ENERGY BUSINESS NEWS...

REPROCESSING OF NUCLEAR FUEL TO BE STUDIED: Five electric utilities and the Davison Chemical division of W. R. Grace & Co. have organized a joint company to study the feasibility of design, construction and operation of a privately owned facility to reprocess "hot scrap" fuel elements from nuclear power plants. The joint company called Industrial Reprocessing Group, consists of Davison Chemical division and five electric utilities: Commonwealth Edison Co., Chicago; Detroit Edison Co.; Northern States Power Co., Minneapolis; Yankee Atomic Electric Co., Boston, and Consolidated Edison Co., New York. (This group runs, or will run, five of the six commercial nuclear power plants in the U. S.) Approval has been given to IRG's proposals by the USAEC. This includes requests for information on the Commission's fuel reprocessing operations, development programs underway, etc. The actual work will be done by Grace's chemical division, with about 6-months needed to complete the study. Overall costs of \$250,000 will be shared by the six members of the Group. Emphasis will be on the Purex process, an aqueous countercurrent solvent extraction system. This permits simultaneous recovery and purification of plutonium, uranium, and thorium. (Davison has much experience in this field: for two years it has been operating a plant at Erwin, Tenn., making uranium and thorium oxide raw materials for fuel element replacement. The operation involves, in part, reprocessing residual products from converting these raw materials into finished fuel elements.)

AGREEMENT SIGNED FOR NUCLEAR RESEARCH CENTER: Funds to the extent of \$1 million will be contributed by New York State on a matching basis with the University of Buffalo to establish a nuclear research center on its campus, under agreement formally signed by the State's Office of Atomic Development and the University. Construction of the center, expected to cost \$2 million, is already under way. It will have a light-water pool-type nuclear research reactor with power level of 1,000 thermal kw, to be supplied by AMF Atomics division of American Machine & Foundry Co. Technical nuclear consultant services will be furnished by Quantum, Inc., Wallingford, Conn. Using the center will be state and federal agencies; commercial and industrial organizations; and educational and research institutions. General manager of the project is James C. Evans, of Buffalo, N.Y.

RAW MATERIALS...prospecting, mining, marketing...

UNITED STATES: Successful operation of Cotter Corp.'s pilot plant at Canon City, Colo., has resulted in USAEC awarding Cotter a uranium purchase contract enabling expansion of this plant to a full-scale uranium processing facility. Capacity will be increased from about 50 tons per day to approximately 200 tons per day under this contract which runs through Feb. 28, 1965.

CANADA: Stanrock Uranium, which went into receivership May, 1959, has reported three firm offers for its contract with Eldorado Mining & Refining, which has a balance of about \$70 million of uranium concentrates to be delivered in the next 39 months. This is through the recent agreement made between Eldorado and the USAEC permitting a company to sell its contract at best terms. Meanwhile, with working force totaling some 850, the company has been operated by the receiver, with operating profits in the \$750,000--\$800,000 per month range, before write-offs, provision for debt repayment, or interest charges. It is now making payments to first priority secured creditors of about \$130,000 per month.

New production rates have been set up by Faraday Uranium Mines as result of Eldorado's "stretch-out" policy. It will mine at the maximum possible rate during the remaining months of its tax-free period to the end of April, 1960. (Canadian mines have first three years of operations free of income tax.) Monthly production rates will then be about 85,000--90,000 lbs. of uranium oxide. After the tax-free period the rate will be reduced to 72,000 lbs. per month. Faraday officials feel this will enable continued economic production to the end of the contract period in July, 1962. (The company has bid on contracts of other producers, since they would enable production after that date. It estimates that some \$8 million will be in its treasury for purchase of such contracts in July 1962.)

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

January 5, 1960